In re Patent Application of:
TOWNSEND ET AL.
Serial No. **10/582,817**
Filed: **June 14, 2006**
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In the Claims:

1.   (Currently Amended) An apparatus for pallet
inspection and repair comprising:

an inspection station comprising at least one ~~having a~~
laser and at least one ~~a~~ camera to collect ~~that collects~~ light
from the at least one laser after being reflected from a pallet
comprising a number of elements to be inspected; ~~, the~~
~~inspection station connected to a computer,~~

a computer configured to run analysis software ~~running~~
~~on the computer~~ that analyses the reflected light ~~reflected off~~
~~the pallet and creates a repair recipe for the pallet~~, the
analysis software configured to perform steps comprising

receiving from the at least one camera a
stream of three-dimensional points, each point having
an x-, a y-, and a z-coordinate,

filtering the stream of three-dimensional
points to obtain a top surface geometry and topography
by discarding points having a z-coordinate below a
threshold,

locating four corner points from the stream
of three-dimensional points, the corner points having
coordinates of (minimum x, minimum y), (minimum x,
maximum y), (maximum x, minimum y), and (maximum x,
maximum),

identifying edges of each element based on

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the four corner points, thereby identifying a type and
number of each element ~~type~~,

determining a pallet design from the type
and number of each element ~~type~~,

loading a set of criteria from a database
based on the pallet design,

comparing each element of the pallet to the
set of criteria to construct a list of repairs, and

creating a repair recipe from the list of
repairs; and

an automated repair station configured to repair ~~that~~
~~repairs~~ the pallet based on ~~according to~~ the repair recipe.

2.   (Currently Amended) The apparatus of claim 1,
wherein ~~wherein:~~ the inspection station moves the pallet
relative to the at least one laser using a robotic arm that
grips the pallet in subsequent repair steps.

Claim 3 (Cancelled).

4.   (Currently Amended) The apparatus of ~~claim 3~~
claim 1, wherein ~~wherein:~~ the element type is selected from a
~~the~~ list comprising any of a ~~of:~~ top board, a leading board, an
intermediate board, a bearer, a stringer, a block, and a bottom
board.

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     5.   (Currently Amended) The apparatus of claim 1, wherein ~~wherein:~~ the repair station ~~comprises:~~ 'comprises a robot arm for holding the pallet during a repair step, ~~a~~ tools for performing ~~a~~ the repair step, and a controlling computer.

     .6.   (Currently Amended) The apparatus of claim 5, wherein ~~wherein:~~ the controlling computer further comprises ~~comprises:~~ a robot controller, a programmable logic controller, and a repair recipe generation sub-system, with ~~such that:~~ the robot controller comprising ~~comprises~~ a master job that is in communication with the programmable logic controller, and a series of sub-jobs activated by the master job, with the master job performing ~~which performs~~ a recipe step using the tools ~~tool~~.

     7.   (Currently Amended) The apparatus of claim 6 wherein ~~wherein:~~ the master job performs the steps comprising ~~of:~~ determining ~~the~~ position of the pallet in the robot arm, moving the pallet to a new position by activating the robot arm, initializing a first sub-job to perform a first repair step, initializing subsequent sub-jobs to perform subsequent repair steps, and terminating when the ~~all~~ sub-jobs in the series of sub-jobs have been performed.

     Claims 8-18 (Cancelled).

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19.   (New) An apparatus for pallet inspection and
repair comprising:

an inspection station comprising at least one laser
and at least one camera to collect light from the at least one
laser after being reflected from a pallet comprising a number of
elements to be inspected; and

a computer configured to run analysis software that
analyses the reflected light, the analysis software configured
to performing the following

receiving from the at least one camera
three-dimensional points, each point having an x-, a
y-, and a z-coordinate,

filtering the three-dimensional points to
obtain a top surface geometry and topography by
discarding points having a z-coordinate below a
threshold,

identifying a type and number of each
element based on the top surface geometry and
topography,

determining a pallet design from the type
and number of each element,

comparing each element of the pallet to a
database to generate a list of repairs, and

generating a repair recipe from the list of
repairs.

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20.   (New) The apparatus of claim 19 further comprising a repair station configured to repair the pallet based on the repair recipe.

21.   (New) The apparatus of claim 19 wherein the analysis software is further configured to performing the following to identify the type and number of each element:

locating four corner points from the three-dimensional points, the corner points having coordinates of (minimum x, minimum y), (minimum x, maximum y), (maximum x, minimum y), and (maximum x, maximum y); and

identifying edges of each element based on the four corner points, thereby identifying the type and number of each element.

22.   (New) The apparatus of claim 19 wherein the analysis software is further configured to loading a set of criteria from the database based on the pallet design, with the set of criteria being compared to each element to generate the list of repairs.

23.   (New) The apparatus of claim 20, wherein the inspection station moves the pallet relative to the at least one laser in subsequent repair steps.

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24.   (New) The apparatus of claim 20, further comprising a transport system for moving the pallet during inspection and repair.

25.   (New) The apparatus of claim 24, wherein the transport system comprises a conveyor.

26.   (New) The apparatus of claim 19, wherein the element type is selected from a list comprising at least one of top board, a leading board, an intermediate board, a bearer, a stringer, a block, and a bottom board.

27.   (New) The apparatus of claim 20, wherein the repair station comprises tools for performing a repair step.

28.   (New) The apparatus of claim 27, wherein the repair station comprises a controlling computer comprising a controller for moving the pallet, a programmable logic controller, and a repair recipe generation sub-system, with the controller comprising a master job that is in communication with the programmable logic controller, and a series of sub-jobs activated by the master job, with the master job performing a recipe step using the tools.

29.   (New) The apparatus of claim 28 wherein the master job performs the steps comprising determining position of the pallet, moving the pallet to a new position, initializing a first sub-job to perform a first repair step, initializing

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subsequent sub-jobs to perform subsequent repair steps, and terminating when the sub-jobs in the series of sub-jobs have been performed.

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